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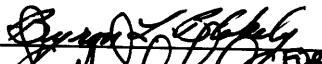
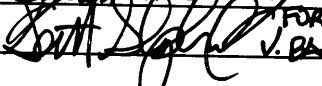
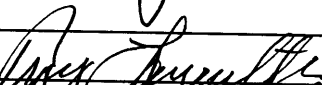
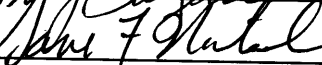
PROJECT NO. 23833

OU 7-13/14 In Situ Grouting Project Support Facilities



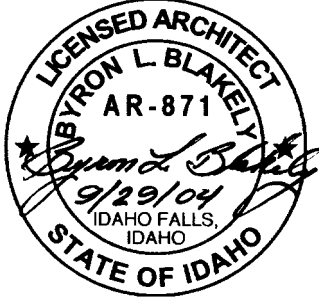
**OU 7-13/14 In Situ Grouting Project
Support Facilities**

EDF No.: 5144 EDF Rev. No.: 0 Project File No.: 23833

1. Title: <u>OU 7-13/14 In Situ Grouting Project Support Facilities</u>				
2. Index Codes:				
Building/Type		<u>WMF-700</u>	Radioactive Waste	
<u>Subsurface Disposal Area</u>		SSC ID <u>N/A</u>	Site Area <u>Management Complex</u>	
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4. EDF Safety Category: _____ or <input checked="" type="checkbox"/> N/A SCC Safety Category: <u>Grade</u> or <input checked="" type="checkbox"/> N/A Consumer				
5. Purpose: This engineering design file (EDF) identifies and defines the type of support facilities that is the most effective for in situ grouting operations and to the subcontractor in bidding to complete this work. Scope: This EDF applies to the design and type of support facilities; any facility procurement; portable facility construction; how well the facilities support operation and maintenance; and how well they fit demobilization, deactivation, and decommissioning of the in situ grouting facilities. Acceptance Criteria: Not required. Results: Results are presented in the body of this EDF. Conclusions Reached: Design is feasible as described within this EDF. Recommendations: Should a procurement specification for the maintenance/storage facility be used, all equipment loads, crane capacities, and design features of this EDF, and codes should be included as a minimum.				
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ACRONYMS

ASCE	American Society of Civil Engineers
CFA	Central Facilities Area
EDF	engineering design file
FY	fiscal year
HVAC	heating, ventilation, and air conditioning
IBC	International Building Code
INEEL	Idaho National Engineering and Environmental Laboratory
ISG	in situ grouting
OSHA	Occupational Health and Safety Act
PC	personal computer
PCM	personnel contamination monitor
RadCon	radiological control
RWMC	Radioactive Waste Management Complex
SDA	Subsurface Disposal Area
SS	stainless steel
TFR	technical and functional requirements
WMF	Waste Management Facility

**OU 7-13/14 In Situ Grouting Project
Support Facilities**

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OU 7-13/14 In Situ Grouting Project Support Facilities

1. PURPOSE

The primary purpose of this engineering design file (EDF) is to identify and define the type of support facilities that is the most effective for in situ grouting (ISG) operations and to the subcontractor in bidding to complete this work. Recommendations are included on how support facilities needs could be met.

The nature of the nonradioactive and radioactive waste environments in the Subsurface Disposal Area (SDA), as well as the schedule, pose many unique constraints and limitations that also effect the building types for the support facilities. These issues have been captured in this EDF to better assist the subcontractor regarding unique features and functions of the support facilities.

A facility study of new and existing mobile and fixed facilities, in support of the Radioactive Waste Management Complex (RWMC) ISG activities within and adjacent to the SDA, was completed. Facility types anticipated to support the grout plant, grout operations, related maintenance/repairs of grouting equipment, storage of equipment, as well as parts and personnel associated with grouting operations over the next seven-year period have been considered. In identifying new and existing facilities, limitations and constraints of ISG within the SDA and how they may effect use or impact facility designs have been noted. Associated with this task was the involvement of operations personnel and grouting consultants who were found to be key in identifying priorities in operating procedures, potential siting strategies, and constraints for facilities/staging areas.

2. BACKGROUND

In situ grouting will be performed at RWMC, located at the Idaho National Engineering and Environmental Laboratory (INEEL). The SDA is an area of approximately 39 ha (approximately 97 acres) located within RWMC. In situ grouting is a method of injecting grout into the soil for contaminant grouting, which stabilizes the waste in the pits and trenches located in the SDA, or for foundation grouting, which is needed for structural foundation enhancement of cap installation.

Grouting in the SDA will be conducted with a large hydraulic excavator (i.e., trackhoe) that deploys a roto-percussion drill rig to inject grout into the waste under high pressure. A high-pressure grout pumping system will be integrated with the trackhoe drill. Operations, maintenance, monitoring, and radiation control systems will be deployed, as well as storage and facility space to support field operations. It is anticipated that the subcontractor will mix the grout on demand at an offsite batch plant, but after the first year will mix grout on demand at an onsite batch plant (the location has been identified as the grout plant and staging area depicted in Figure 1).

The original intent of this study was to approach the seven years of ISG as if the site contractor was performing the work; however, redirection of the question strategy was given to complete the study as if performed by a subcontractor. A grout supply vendor will be subcontracted to provide grout as specified by the project. Some of the findings and recommendations may be found to be more suitable to having the contractor versus the subcontractor perform the work; therefore, the subcontractor may not follow the approach of this study exactly. However, the information contained herein should be very helpful to familiarize the subcontractor with the view of how this work could be performed.

Figure 1. Radioactive Waste Management Complex map, showing the Subsurface Disposal Area where in situ grouting work will be performed and the existing facilities.

Support facilities would be best located adjacent to the work area to enhance performance. However, fixed facilities are not allowed inside the SDA, and those that are located outside, even though fixed facilities, are encouraged to be relocatable or mobile type because of project duration. Mobile facilities are identified and discussed in Section 5 of this EDF. A perspective view of support facilities adjacent to the batch plant near the south SDA gate is depicted in Figure 2.

This project will be accomplished over a seven-year period, with one drill rig used the first year, and an anticipated three trackhoe drill rigs being used for the second through seventh years. The support facilities proposed design is based on the required jet grouting capacity of three trackhoe drill rigs operating simultaneously.

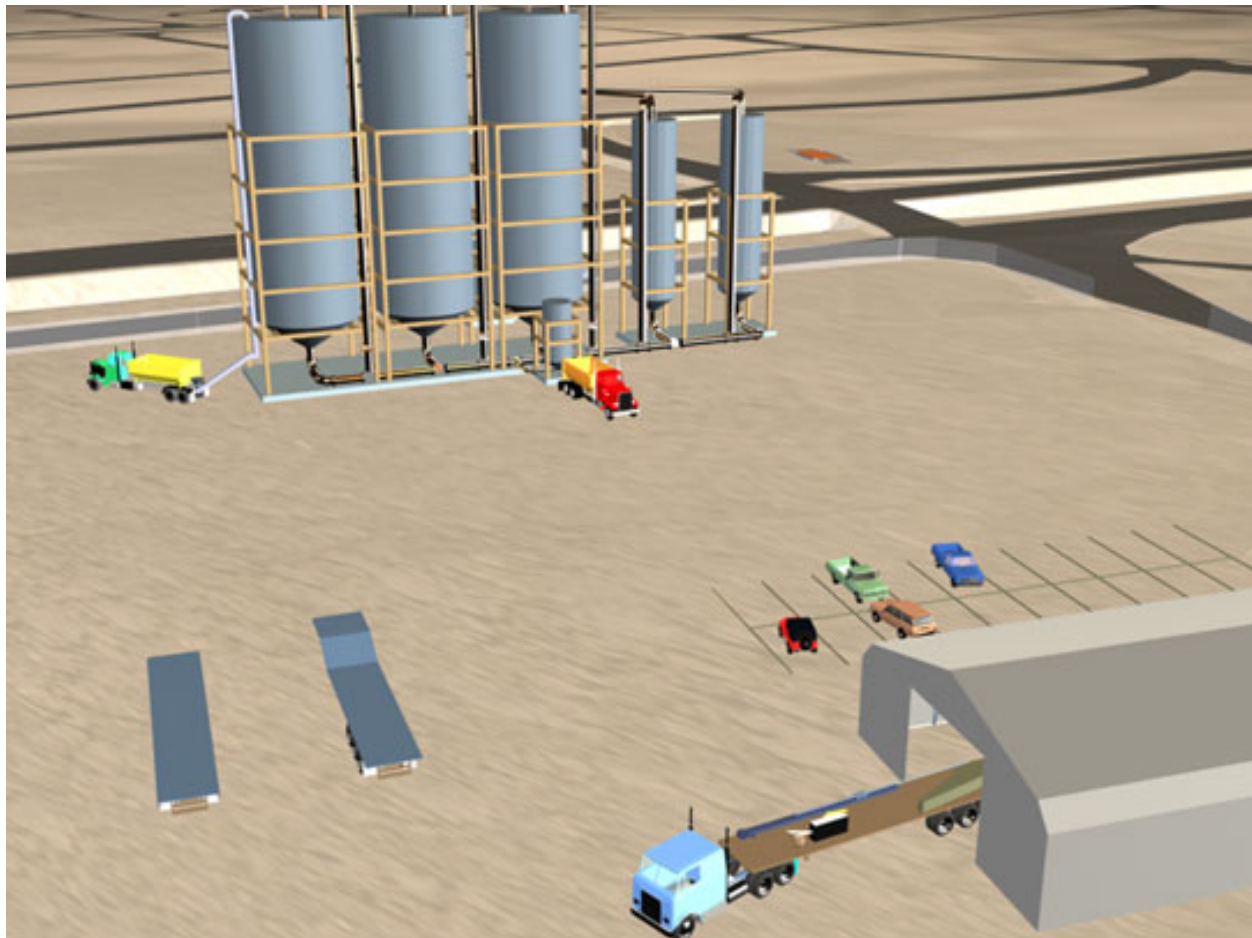


Figure 2. Perspective view of support facilities adjacent to the batch plant.

3. SCOPE

The scope of this EDF is focused on the design and type of ISG support facilities; facility procurement; portable facility implementation; how well the facilities support operations and maintenance; and how well they fit demobilization, deactivation, and decommissioning.

The design team identified a list of facility needs as follows:

1. Radiological control (RadCon) office, change room, and space to address contamination
2. Lunchroom and services
3. Shift office
4. Diesel storage
5. Liquid additive
6. Maintenance/repairs, equipment storage, and spare parts storage
7. Control structures
8. Sample management
9. Trailers
10. Contamination (drill-stem wiper assembly)
11. Decontamination structure.

Considerable research and investigation of these facility needs was made; however, on June 2, 2004 a new directive was given that all ISG would be subcontracted, including facility needs. Some of the findings and recommendations may be found to be more suitable to having the contractor versus the subcontractor perform the work; therefore, the subcontractor may not follow the approach of this study exactly. However, the information contained herein should be very helpful to familiarize the subcontractor with the view of how this work could be performed.

Based upon the environment, location, schedule, and type of work to be performed, the facility study determined that two facility types would be most probable—fixed/relocatable for outside the SDA and mobile facilities for inside the SDA. These facility types are discussed in detail in Section 5 of this EDF.

4. REQUIREMENTS

The technical and functional requirements (TFRs) for the ISG Project are listed in TFR-269, “Requirements (Assumptions) for the OU 7-13/14 In Situ Grouting Project.” The specific requirements applicable to the ISG support facilities are listed below and are followed by a brief discussion of how each requirement is to be met.

Provide office for radiological control personnel.

This requirement will be met by using the existing RadCon personnel, the existing RadCon Office at Waste Management Facility (WMF)-602, and the RadCon truck and trailer in the SDA.

Provide facility for lunchroom.

The best solution for hot food services at RWMC already exists and is catered to the RWMC WMF-637 lunchroom by the Central Facilities Area (CFA) Cafeteria. As a second option, a lunchroom for cold lunches could be used in any new facility with restrooms having hand washing capabilities, located at the staging area by the grout plant outside the SDA south gate.

Provide facility to change clothes.

Shower, locker, and restroom facilities already exist inside WMF-637, where employees can change clothes. A second option exists in the WMF-645 and 646 trailers, where they have lockers and space to change clothes. A third option could be in the existing WMF-656 carpenter shop, which also has restrooms and space to change clothes. Anything beyond this, or should these existing facilities not be available to the subcontractor, would be to house such needs inside new fixed or portable facilities.

Provide office for shift supervision.

It is highly recommended that a new shift crew office trailer with a self-contained conference room, office, and data collection, and that is adaptive to generated power in the SDA be located as close as possible to the daily grouting operations. This is to ensure immediate response and accuracy to enhance performance and safety and to minimize worker fatigue.

Providing a diesel storage facility is not anticipated.

Diesel delivery shall be direct from the diesel fuel trucks to the equipment in the field, as needed. See EDF-5150, "OU 7-13/14 In Situ Grouting Project Support Systems," for additional information.

Provide facility dry storage space for sodium thiosulfate bags on pallets in the maintenance/storage facility.

Other liquid additives are suggested to be stored in tanker trailer pups parked in the staging area. See EDF-5135, "OU 7-13/14 In Situ Grouting Project Grout Storage and Mixing," for additional information.

Provide multiple grout storage silos for grout materials at the batch plant staging area.

See EDF-5135 for additional information.

Provide facility for maintenance, parts and repairs.

A maintenance/storage facility would house a shop for maintenance, cranes, forklift, man lift, and spare parts storage to support drill mast refurbishment and seasonal trackhoe drill maintenance activities.

Provide structure for decontamination control.

A decontamination pan will be provided at the SDA just inside the south gate. It is a portable pan with fold-up sides to contain wash down water with cribbing used for equipment to cross over it without crushing the pan. Time for decontamination would vary based on the size of equipment and its work environment. The wash down water would then be allowed to evaporate. The pans can be acquired from local irrigation vendors, such as Rain for Rent.

Provide facility (trailer) for sample management.

The INEEL Sample Management Organization provides such facilities and services at RWMC. Field trailers exist and can be used for ISG operations in the SDA.

Provide facility for contamination control.

A portable drill-stem wiper assembly will be provided in the SDA with the trackhoe drill-rig to decontaminate the drill mast. See EDF-5155, "OU 7-13/14 In Situ Grouting Project Operations, Maintenance, and Logistics," for additional information.

Provide storage space for temporary lighting, stands, lamps, parts and accessories to support grouting in the SDA, as well as the lighting equipment itself.

Such storage shall be convenient storage, designed for such configurations and located near grouting operations so as to be readily available. The shift crew office and maintenance trailer is where this equipment is recommended to be stored. For information on temporary lighting equipment, see EDF-5122, "OU 7-13/14 In Situ Grouting Project Electrical Utilities."

5. SYSTEM CLASSIFICATIONS, CATEGORIZATIONS, AND DETERMINATIONS

5.1 Safety Category

An ISG safety authorization basis document is being written to address the issue of system safety classification. Until this document is issued, the RWMC ISG support facilities subsystem safety category will be assumed to be consumer grade (INEEL/EXT-03-00316).

5.2 Natural Phenomena

The RWMC ISG support facilities subsystem is Performance Category 1 regarding natural phenomena hazard classification, except that some items may be temporary structures per the requirement of the International Building Code (IBC) or American Society of Civil Engineers (ASCE) 7. The maintenance and storage facility is an IBC Category II structure in regard to Importance Factors. The mapped spectral accelerations for RWMC are as follows:

- Short period acceleration value is 0.357
- One-second acceleration value is 0.131.

5.3 System Description

5.3.1 Existing Facilities

RWMC has some existing facilities that may be available and adaptive to ISG operations. The RWMC RadCon operations will be involved daily in support of the grouting operations, and it is anticipated that the RadCon truck and trailer will be used in the SDA. The WMF-601 RadCon building will be used in support of activities outside of the SDA. A request to reserve the RadCon truck and trailer has been made to management, and it is assumed that WMF-601 will be available as needed for ISG.

5.3.1.1 Existing Radiological Control Facilities. The RWMC RadCon operates out of the existing RadCon facility located in WMF-601 and will provide continued support for ISG operations. The facility offers a contamination hood to the ISG project. A photo of this facility and its floor plan are depicted in Figures 3 and 4, respectfully.



Figure 3. Radioactive Waste Management Complex WMF-601 radiological control building.

The WMF-601 RadCon facility, personnel services, equipment, and shower/locker/restroom would be used for ISG operations.

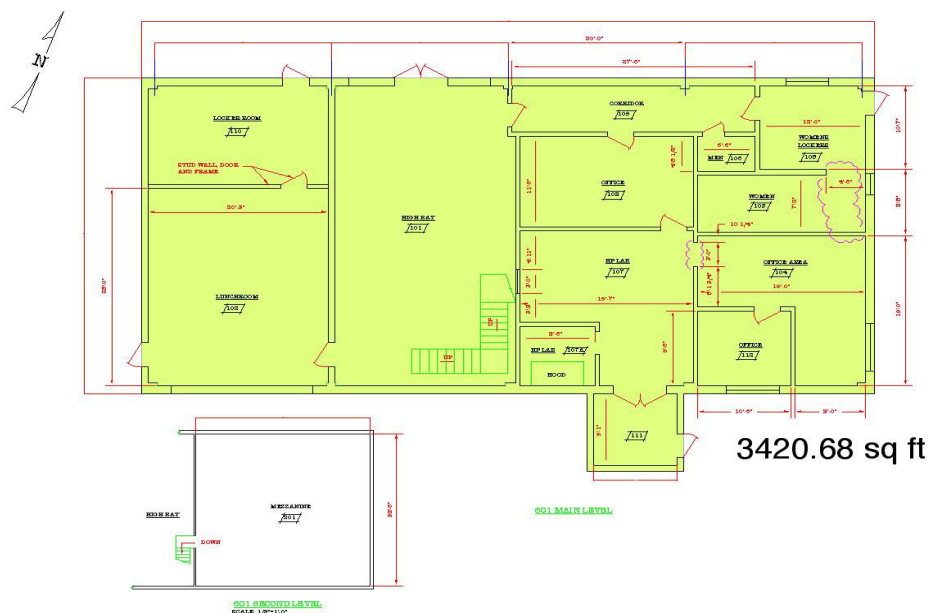


Figure 4. Radioactive Waste Management Complex WMF-601 floor plan.

5.3.1.2 Existing Mobile Radiological Control Facilities. Inside the SDA, RWMC RadCon personnel will provide their support with their mobile RadCon truck and trailer unit (see Figure 5). This

RadCon truck and trailer unit has been reserved for the ISG Project. Possible staging locations for the RadCon truck and trailer in the SDA are shown in Figure 24.



Figure 5. Radiological control truck and trailer.

Figures 6 through 9 show the personnel monitoring equipment and field equipment located within the RadCon truck and trailer. The two doors offer a one-way path of entry and exit of personnel to better monitor personnel and minimize contamination when detected.



Figure 6. Personnel Contamination Monitor-2, Eberline stand-in unit.

The Personnel Contamination Monitor (PCM)-2, Eberline stand-in unit takes about 20 to 40 seconds per side, or 80 seconds maximum per person coming out of the SDA grouting area.



Figure 7. Portable beta gamma and alpha friskers.

Figure 7 depicts portable beta gamma and alpha friskers for personnel who set off the alarm of the PCM-2 more than twice. A RadCon technician is then called in to perform the frisking, which takes 5 to 10 minutes per person.



Figure 8. Constant air monitors and scalers for the accounting lab.



Figure 9. Bottled P-10 gas for PCM-2 units.

5.3.1.3 Other Existing Fixed Facilities. The operations control building has conference rooms, lunchroom services, and shower/locker/restroom facilities that could potentially be used by ISG operations personnel. A photo of this facility is depicted in Figure 10.



Figure 10. Radioactive Waste Management Complex WMF-637 operations control building.

OU 7-13/14 In Situ Grouting Project Support Facilities

Facility space and service areas that may be of interest to the subcontractor have been color shaded on the floor plan shown in Figure 11. Arrangements by the subcontractor would have to be made to reserve and ensure the use of these areas, otherwise similar space and services would have to be duplicated elsewhere by the subcontractor during ISG operations.

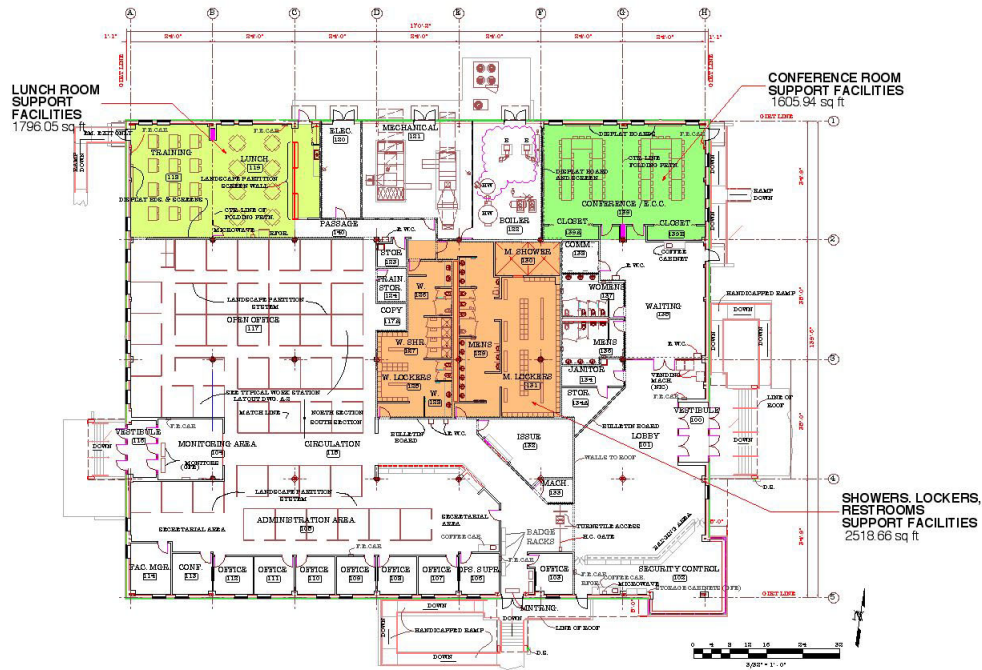


Figure 11. Radioactive Waste Management Complex WMF-637 operations control building floor plan.

The RWMC WMF-656 carpenter shop floor plan (see Figures 12 and 13) contains approximately 8,000 ft² of flexible shop-type space, including plumbing for restroom and drinking water. This facility may be available, but would need to be confirmed by the subcontractor.



Figure 12. Radioactive Waste Management Complex WMF-656 carpenter shop.

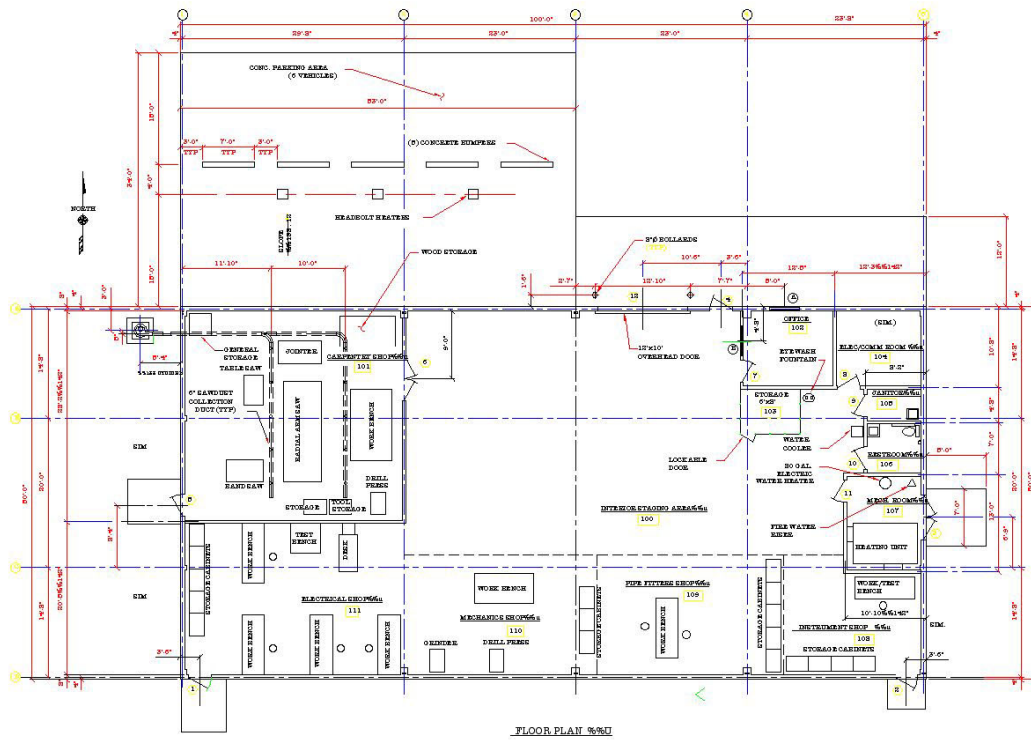


Figure 13. Radioactive Waste Management Complex WMF-656 carpenter shop floor plan.

The RWMC WMF-609 maintenance facility storage shed may have two bays identified for ISG operations, but would need to be confirmed by the subcontractor (see Figure 14).

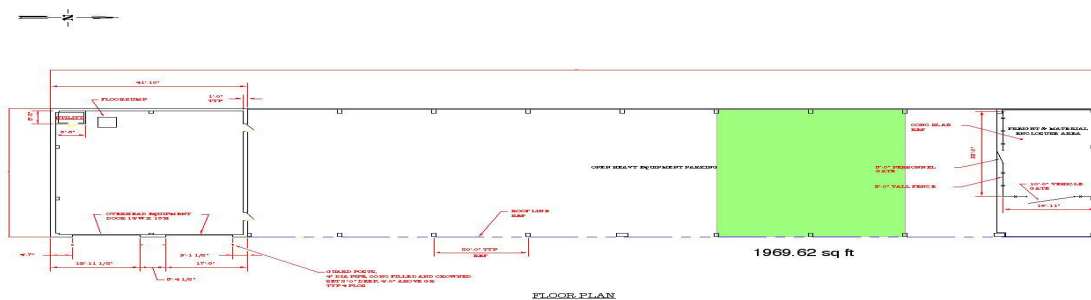


Figure 14. Radioactive Waste Management Complex WMF-609 maintenance facility storage shed floor plan.

5.3.2 Existing Constraints

Some of the existing constraints identified within the SDA and adjacent areas are as follows:

1. The ongoing work being performed by others within the SDA that needs to be coordinated
2. Congested traffic at the existing gates and roadways, both in and outside of the SDA, is anticipated
3. There are constraints on what activities can take place and how they have to be performed within the SDA
4. Limited utilities (e.g., power) at the south gate and none within the SDA
5. The available real estate for staging areas is extremely limited within the SDA and is constrained to a limited number of trailer staging areas adjacent to roadways within the SDA (see Figure 24)
6. Railroad limitations
7. Existing facility limitations.

5.3.3 New Facilities

Both relocatable and mobile facility types have been considered in this study. One new relocatable facility is recommended—a maintenance/storage facility. One new mobile facility is recommended—a shift crew office and maintenance building. A portable decontamination pan is also recommended for decontaminating equipment coming out of the SDA.

5.3.3.1 Proposed New Maintenance Storage Facility. The maintenance/storage facility would be used to support storage and refurbishment of grout drill masts, trackhoe drill, high- and low-pressure grouting systems, forklift, man lift, parts, add mixture in bags, and so forth. This relocatable facility would be similar to that of RUBB Building Systems and classified as a S-2 Occupancy.

The facility would not be insulated and would have no heating, ventilation, and air conditioning (HVAC) systems.

The size of the new maintenance/storage facility is suggested at be 50 ft × 100 ft and should not exceed 5,000 ft² or one million dollars in value. This approach would minimize fire protection requirements in an area where no firewater lines exist.

Bottled water services for drinking and toilet facilities and/or self-contained comfort stations with sewer systems services would be required at a minimum. No other utilities systems have been identified.

The maintenance/storage facility shall be located adjacent to the future ISG grout plant that is being considered outside of the SDA near the south entrance (see Figures 1 through 3). For additional information, see Section 5.3.3.3 of this EDF.

5.3.3.2 Proposed Staging Area for Grout Plant. The potential staging area identified for any new facilities in support of ISG is just outside the south gate, adjacent to the grout plant and shown as a perspective in Figure 15. The only existing utility provided for this area is I Phase 480-V power. Potable water provided in a new 2-in. line (minimum) has been identified for this area to support grout mixing at the batch plant and restrooms.

Any new relocatable/fixed support facilities would be located on the staging area at the south gate of the SDA. Only one new relocatable facility has been identified for supporting ISG and is suggested as a relocatable fabric structure (similar to those by RUBB), and is depicted in the lower right hand corner of Figure 15. There is also staging space for other portable support facilities and parking of vehicles and equipment in this area at the subcontractor option.

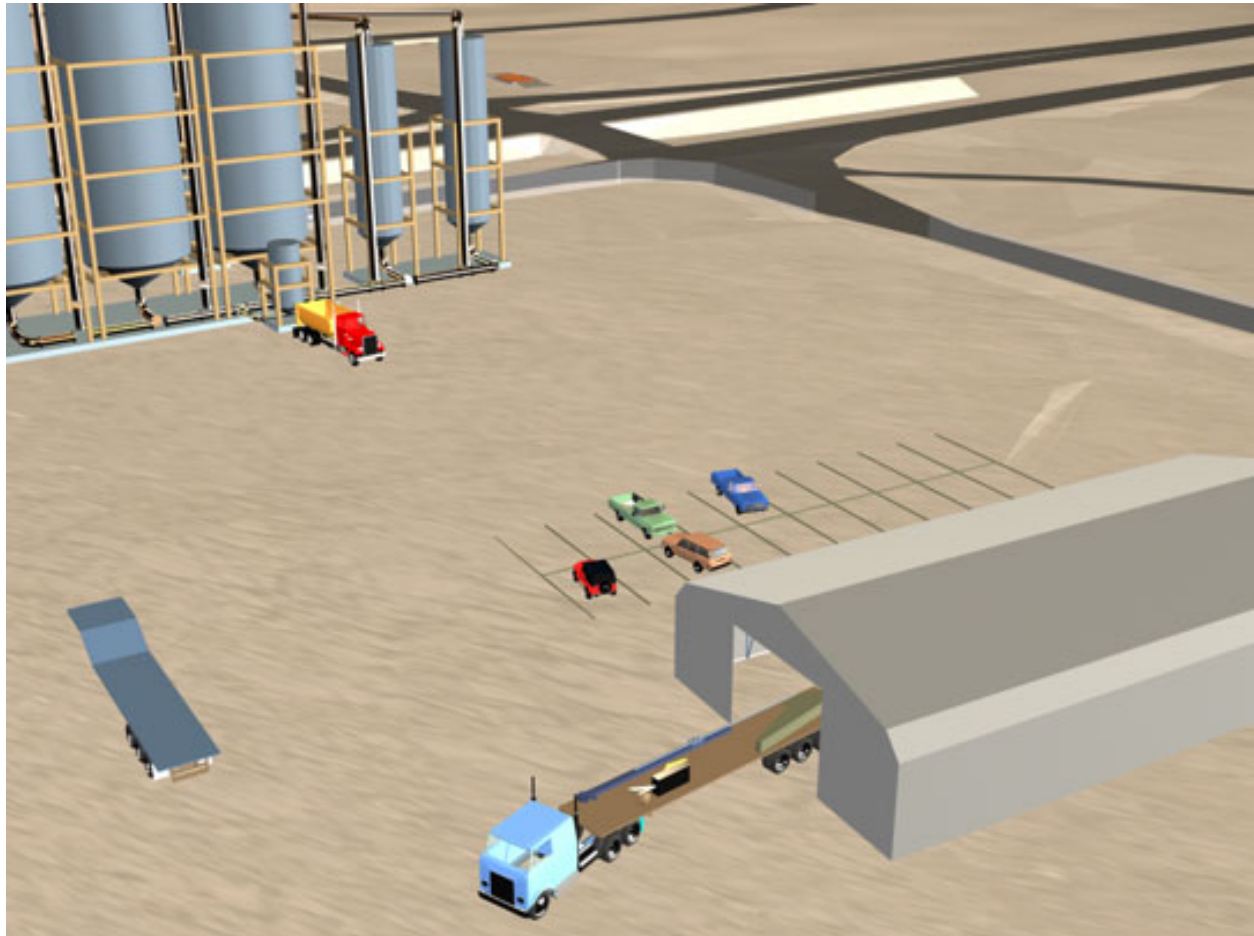


Figure 15. Perspective view of new in situ grouting support facilities.

5.3.3.3 New Maintenance/Storage Facility. The new maintenance/storage facility would support maintenance activities of a large trackhoe(s) with a grout drill mast attached, plus high-pressure and low-pressure grouting unit(s). It is anticipated that grouting operations will require immediate response when it comes to maintenance and repairs. To best accommodate these needs and to enhance the performance of grouting, several spare refurbished drill mast assemblies would be placed on flatbed semi-trailers as surge storage and staged inside the SDA to replace those in operation. These drill mast assemblies would be rotated from the SDA on these flat bed semi-trailers into the maintenance/storage facility shown in Figure 17 to be refurbished and then restaged again on a flatbed semi-trailer inside the SDA, adjacent to grouting.

The new maintenance/storage facility would be a relocatable facility similar to that of RUBB Building Systems and classified as a S-2 Occupancy. It would have an approximate 8-in. thick reinforced concrete floor to anchor the building frame and a 2-ton jib crane, to minimize maintenance, to store materials and parts, to provide a rolling surface for a 20-ton gantry crane, and to support trackhoe

maintenance. Should the subcontractor elect to install such a facility, it is suggested that the floor and footing design be submitted as vendor data for approval. The structural frame would be a clear span of steel frame/truss offering a clear span space below for flexibility. The membrane would be a reinforced, translucent Tedlar-fabric for both the roof and walls. Tedlar is a patented fabric with many fire-resistant and durable qualities, including a resistance to absorbing diesel fumes and causing a carcinogen.

The facility would not be insulated and would have no HVAC systems.

The size of the new maintenance/storage facility is suggested at be 50 ft × 100 ft and should not exceed 5,000 ft² or one million dollars in value. This approach would minimize fire protection requirements in an area where no firewater lines exist. It is suggested the building have a minimum of two overhead doors, at least one at each gable end to minimize precipitation concerns and to allow flow through traffic. The overhead doors are suggested to be approximately 14 ft × 20 ft (size may change based upon trackhoe size), and have adjacent personnel doors for egress. The facility would function as a seasonal maintenance shop, as well as storage of materials. Such storage space for parts and materials would allow bulk quantity purchases and cost savings. The haunch height of the walls is anticipated to be at 18 ft to accommodate storage, maneuvering space of vehicles, and the rolling 20-ton gantry crane.

This type of enclosure would also allow a cleaner and more protected environment for repairs and maintenance of equipment and the refurbishment of the drill masts. Lighting and power to meet codes, along with wireless communications, is anticipated. Except for the concrete floor, the maintenance/storage relocatable structure could be reassigned to other projects, relocated to another work site, or be sold when the ISG work came to a close.



Figure 16. Proposed new RUBB fabric maintenance/storage facility.

The following are suggested features, functions, and furnishings of this facility:

- Floor surfacing shall be impervious and finish (i.e., nonslip and decontaminable).
- Provide work counters with stainless steel (SS) bench top surfaces and upper and lower cabinets with P/L faces.
- Workbenches shall be equipped with vices, pipe vices, beveller, chop saw, grinder, anvil, 1/2-hp drill press, and bolt and screw fastener bins.

- Provide welder and cutting tools.
- Shop facility shall have a 20-ton gantry crane handling large parts and assemblies.
- Shop facility shall have a jib crane with 2-ton hoist and with storage racks, compartments for parts, and material stock.
- Shop area shall have manifold compressed air and shop vacuum.
- Man lift and forklift shall be provided.
- Solvent tank for cleaning internal parts of refurbished assemblies may be required.
- Facility shall be functional, well-organized, durable heavy duty, have toolbox and part compartments, and have drawers integral with glides, all designed for maximum efficiency and convenience.
- Facility shall have a personal computer (PC) work station/office with wireless network connection.
- Facility shall have wireless communications (e.g., telephone and fax) insulated with HVAC climate control capabilities.

5.3.3.4 Proposed New Mobile Facilities. One type of mobile facility is identified as the shift crew office and maintenance facility is highly recommended to the subcontractor for this project in Fiscal Year (FY)-2005, which would provide direct support for grouting operations over the next seven years at the SDA. A second mobile facility type that was recommended was a RadCon facility. However, RWMC RadCon operations has an existing RadCon WMF-601 facility and RadCon truck and trailer discussed in Sections 5.3.1.1 and 5.3.1.2 of this EDF that are well suited for ISG operations. A third mobile facility type that may be utilized by the subcontractor is a mobile comfort station, as described in Section 5.3.3.5 of this EDF.

Our best recommendation to meet the need of the new mobile shift crew office and maintenance facility is with trailer products as produced by, or equal to, Featherlite Inc. of Cresco, Iowa. After extensive research of custom trailer manufacturers, evaluation of their customized capabilities, production capabilities, quality controls, track record with customers, and actual plant tours, we concluded that Featherlite Inc. would be one, if not the best vendor, for such facilities.

The seven years of grouting operations at the SDA pits and trenches (approximately 120,000 holes) has a limited down time for grouting; therefore, we foresee that it will be extremely important to have all possible maintenance and support operation needs adjacent to the work activities, emphasizing performance.

5.3.3.5 New Mobile Shift Crew Office and Maintenance Facility. It is anticipated that the grouting operations will need shift office space adjacent to grouting for the shift crew for daily planning and related office space for operations. To ensure immediate response to trouble-shooting, supervision to ensure quality of work, coordination of related work activities as well as work by others, and data collection of ongoing grouting, a mobile shift crew office facility is highly recommended. It is proposed to be located inside the SDA reasonably close to the grouting operations. It is anticipated that a mobile shift crew office facility in a trailer of this type would offer extreme advantages and enhance the performance the shift crew. This shift crew office trailer would be moved periodically to follow grouting

done by the trackhoe drill rig by semi-tractor. This mobile facility would be self-contained as far as utilities. It would have self-generating capabilities of its own, and to ease worker fatigue of ongoing generator noise it would also have adaptive capabilities to take power from remote portable generators as well.

Research of trailer manufacturers of such mobile facilities found that most suited by those manufacturers specializing with a long history of custom semi-trailers designs and construction. The basic size of these trailers is approximately 53 ft-0 in. × 8 ft-6 in. × 13 ft-6 in., with multiple expansion options. A mobile shift crew office and maintenance facility of this type would provide a conference room for approximately six people in the nose of the trailer, an office area with two workstations for data collection in the middle, and a field maintenance area at the rear of the trailer (see Figure 17).



Figure 17. Typical aluminum trailer facility by Featherlite.

Potential staging locations in the SDA can be seen in Figure 24. The mobile facility requirements to date are as follows:

- Facility trailer (shift crew office) shall be completely portable (i.e., move twice a month) and capable of being parked on and off the dirt roads of the SDA. A built-in, proven, safe and completely automated load leveling system to level the facility trailer after each move in a timely manner with hand controls shall be provided.
- Facility trailer shall be by an experienced (i.e., 30 years) vendor.
- Facility trailer shall have a five-year warranty on the frame and shell.
- Facility trailer shall have structurally-analyzed frames and enclosures to withstand rigorous and numerous moves and operations.

- Except for windows and slide outs (of aluminum construction), the facility trailer roof and side walls shall be of (painted) continuous smooth 090 gauge sheet aluminum for strength and deconability.
- Aluminum walls shall be insulated to a minimum of R-15.
- Facility trailer shall be provided with its own HVAC system.
- Facility trailer shall be 8 ft-6 in. wide, 53-ft long, 13 ft-6 in. high and of all aluminum, noncorrosive construction (other than critical structural features) to allow for more payload, minimize decontamination/maintenance concerns, and extended life cycle.
- Facility trailer shall be equipped with 17-ft slide-out options on each side for space enhancements, estimate at 600 + ft²/unit. This area of the trailer shall have two (with expansion four) PC workstations with wireless network connections (see Figure 18).



Figure 18. Slide-out data collection workstations with maintenance area beyond.

- Kingpin to rear axle will not exceed bridge laws (no greater than 40 ft).
- Floor surfacing shall be impervious with integral curb and finish (i.e., nonslip and decontaminable). The height of the floor surface shall be no higher than 22 in. from the ground.
- Facility office trailer nose shall have windows, potential slide outs on each side, and a conference room with fold-out/expandable table with seating for 6 people (see Figure 19).



Figure 19. Example of conference area located in the nose of the trailer

- Facility trailer shall be durable to withstand highway transportation, regular moves, and restaging over the SDA roadways without racking, jeopardizing its resale, reuse, facility values, and while minimizing depreciation loss.
- Facility trailer shall have wireless communications (e.g., telephone and fax) insulated with HVAC climate control capabilities.
- Facility trailer shall have both interior and exterior lighting (including out rigging [foldouts] for auxiliary lighting, power, and diesel generator).
- Exterior slide-out compartments, where possible, beneath the facility shall be incorporated for storage items.
- All doors shall have insect screen and plastic air curtain capabilities.
- Trailer office shall have a DVD player and TV monitor and digital video replay. Think in terms of digital replay of video versus tapes. In other words, the digital replay of any image data would be retrieved from the computer server.
- Trailer office shall have communications with the shift desk (e.g., radios). A place for the RWMC-approved handheld trunk radios with battery chargers shall be provided.

- Data collection for visual, density, depth, and volume monitoring equipment for grouting shall be provided.
- Integral drawers with glides, P/L cabinets, storage closets with melamine surfaces, solid surfacing countertops (office areas), and specialized compartments shall be provided.
- Awnings for work enhancements and out rigging (foldouts) for auxiliary lighting shall be provided.
- Parallel work counters, cupboards, and windows on each side of the slide-out portions with SS bench top surfaces (maintenance areas), P/L cabinet faces, and upper cupboards shall be provided.



Figure 20. Parallel workbenches can be seen in the foreground of the maintenance area with the office/data collection and conference areas located in the nose of the trailer beyond. This portion could also have glide-outs offering more work area.

- Workbenches shall be equipped with vices, pipe vices, beveller, chop saw, grinder, anvil, 1/2-hp drill press, and bolt and screw fastener bins (see Figures 21, 22, and 23).
- Rear portion behind the wheel wells shall be open work area for general repairs, service, assembly, and disassembly of equipment.



Figure 21. Work benches (1).



Figure 22. Work benches (2).

- Facility trailer maintenance area shall have overhead monorail with 500 # hoist and attic with storage racks, and slide-out compartments for parts and material stock (see Figure 23).
- The field maintenance area at the rear of the trailer would have workbenches, parts, and shop tool storage, rear door with plastic air curtain, durable/decontaminable nonskid floor, and a monorail crane to enhance field support of heavy items.



Figure 23. Work benches (3).

- Access to the field maintenance area shall be by electric internal screw lift type platform for reliability. Screw lift platform shall also be the end door of the trailer.
- Shop area shall have manifold compressed air and shop vacuum.
- Functionally well-organized, durable heavy duty, toolbox and part compartments, and drawers integral with glides, all designed for maximum efficiency and convenience shall be provided.
- Storage of field tools, hand instruments, measuring devices, protective clothing, maintenance tools, and safety equipment would also be stored in this trailer facility.

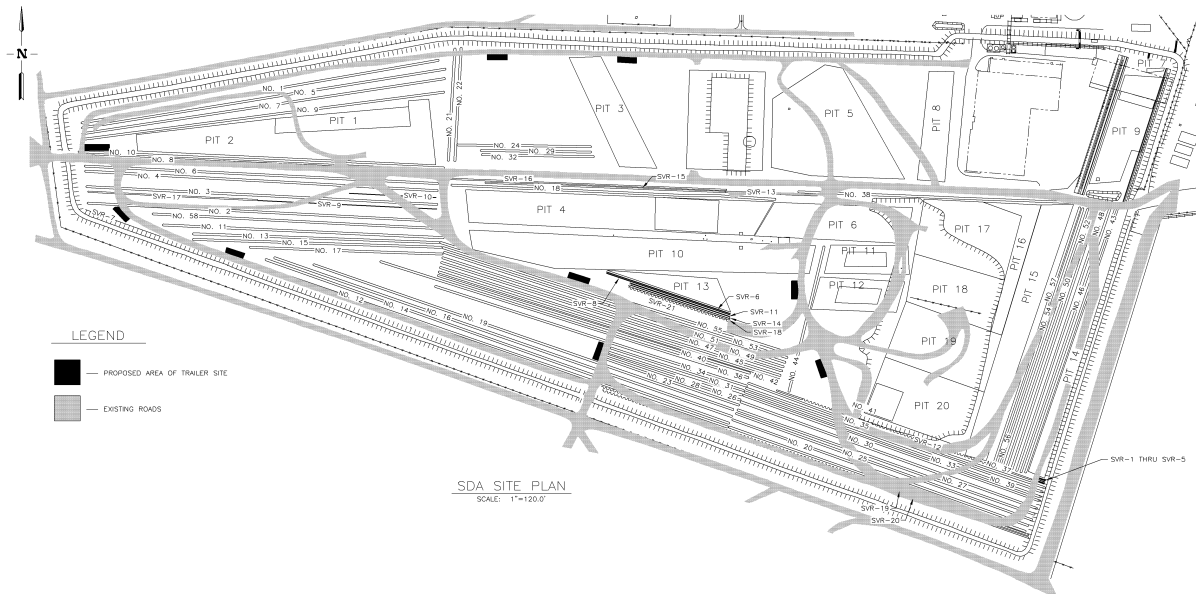


Figure 24. Subsurface Disposal Area site plan.

5.3.3.6 Other Mobile Facilities and Vehicles. Existing RadCon trailer, mini utility vehicles, man lifts, forty-foot flat semi-trailers with cribbing (for transferring refurbished and spent drill mast assemblies [assume two drill masts/trackhoes initially for the first year]), and mobile comfort stations (see Section 5.3.3.6) are the other mobile facilities and vehicles recommended.

Pickups, lightweight trucks, and mini utility vehicles are anticipated to play a large role in ISG operations by the time they may save in shuttling personnel across the SDA (see Figure 25 for an example only of a mini utility vehicle).



Figure 25. Mule 3010 diesel model by Kawasaki.

5.3.3.7 Toilet Facilities. Toilet facilities will be required per the Occupational Safety and Health Act (OSHA) at the SDA south gate batch plant area because of the following:

- Because of the duration of the ISG Project inside the SDA, the work crew cannot be interpreted as a mobile crew.
- Workers most likely will be subjected to work longer than 3-hour intervals and have to travel more than 1/4 mile to reach existing restrooms.
- There are no water or sewer utilities inside the SDA, nor are they allowed.
- Hand washing and drinking water must also be provided per OSHA sanitary standards.
- Toilet facilities provided, whether fixed or portable (example only shown in Figure 26), must be self-contained because of no sewer line and must offer timely access (taking less than 10 minutes to access).
- There must be sufficient “relief workers” to ensure these requirements can be met.



Figure 26. Example of portable toilet facilities.

6. ASSUMPTIONS

The following are assumptions for support facilities for the ISG Project:

1. Inspection and/or decontamination of personnel and equipment when exiting the SDA will be required.
2. No water or food will be allowed in SDA
3. No fixed utilities exist and will not be allowed within the SDA
4. Delivery of all grout products will be by truck rather than by railroad.
5. Grouting shall be contracted by a vendor/subcontractor.
6. Grouting duration period is seven years, concluding in FY-2011 and complete by FY-2012.
7. Relocatable facilities are to be located outside the SDA and mobile facilities inside the SDA.
8. The combination of proximity of facilities located at the SDA south gate and the duration of ISG operations voids the use of mobile crew interpretation per OSHA regarding toilet facilities. Therefore, toilet facilities shall be provided at that location.

7. DESIGN CRITERIA

7.1 Applicable Design Codes and Standards

IBC

Architectural Engineering Standards

OSHA-Part 1910, Subpart-General Environmental Controls

Safe Drinking Water Act

7.2 Loads

The gantry crane and a jib crane shall be provided in the proposed new maintenance/storage facility with a capacity of 20 tons and 2 tons, respectively.

The reinforced concrete floor slab of the proposed new maintenance/storage facility shall be designed to support approximately 1,500 lb/ft². Mobile trailer facilities shall not exceed a maximum of 10,000 lb/axle.

Snow load design shall meet the requirements of the IBC. 30 lb/ft² shall be used as a minimum design load for roofs.

Wind load design shall meet 90 mph basic wind speed per the IBC.

8. RISKS

1. Grouting in inclement weather and abnormal weather seasons without facilities is a risk to schedule, safety, and quality control.
2. Facility trailers and relocatable facilities could be long lead items.
3. Any new ISG facilities located at the south gate area without toilet facilities risks OSHA compliance for employees.
4. Technical risks include fixed contaminants potentially missed in the decontamination wash down booth for the drill mast assembly inside the SDA and were not found until after it had left the SDA.

9. LOGISTICS SUPPORT

Logistics for support facilities for the ISG operations are anticipated as follows:

1. RadCon Support from RWMC RadCon personnel, the use of their facilities (e.g., WMF-601 and the RadCon truck) is anticipated.
2. Food services in the past has been catered by contract from the CFA Cafeteria, and served in the RWMC WMF-637 lunchroom. Food services of this type are available and anticipated to be needed by the subcontractor.
3. Diesel storage/supply services in large quantities are anticipated at RWMC for ISG operations.
4. Water supplied utilities are nonexistent at the batch plant/support facility staging area. The use of water, other than dust control, is not allowed inside the SDA.
5. A potable water supply line of approximately 2-in. diameter for a water holding tank at the grout plant and toilet facilities/comfort stations near the maintenance/storage facility is required.
6. Bottled water services for drinking is an option for workers outside of the SDA.
7. Based upon the facility size and type of facilities, no firewater for fire protection of support facilities is anticipated for this project.
8. Sewer contracting services for servicing self-contained sewer systems and/or portable comfort stations are most likely to be used.
9. 7200-KV, I Phase power exists at the south gate to the SDA and III Phase, 480-V will be required.
10. Road improvements and maintenance will be required because of high volume of truck traffic (e.g., 49 trucks/week of raw materials). The subcontractor will need to coordinate maintenance concerns, but all maintenance both inside and outside the SDA will be the responsibility of RWMC. All road maintenance snow removal services outside the RWMC fence for service roads will be necessary and provided by CFA.
11. The contractor shall provide security services.

10. RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

Engineered fill for a staging area for relocatable facilities and a grout plant will be provided by the contractor, located just outside of the SDA adjacent to the south gate.

A relocatable maintenance/storage (fabric RUBB) facility and trailer facilities, as needed by the subcontractor, are anticipated adjacent to the grout plant.

The maintenance/storage facility would house a shop for maintenance, cranes, man lifts, forklift, grout mixing materials, and spare part storage to support drill mast refurbishment and seasonal maintenance activities. This facility is recommended to be under 5,000 ft² to avoid invoking a fire suppression system, and be relocatable, similar to those by RUBB Building Systems. Such a facility type would also help minimize cost and demobilization, deactivation, and decommissioning requirements.

A rotating inventory of drill mast assemblies would be cleaned and refurbished in this facility during the season of operations. It is recommended that they be staged on 40-ft flatbed semi-trailers.

Bottled drinking water and hand washing capabilities are recommended for many areas to meet drinking water and sanitation requirements.

Food services catered by the CFA Cafeteria to the RWMC WMF-637 lunchroom for subcontractors are recommended.

Diesel-powered portable generators are recommended to support trailer facilities, work lights, and grouting equipment inside the SDA.

III Phase, 480-V power is recommended for support facilities at the staging area.

The following mobile facilities are recommended:

- Self-contained portable restrooms are a recommendation for toilet facilities at the south staging area.
- A new mobile facility identified as a shift crew office and maintenance trailer is recommended to be located at identified locations in the SDA.
- The existing RadCon truck and trailer are recommended for ISG operations. It would be located inside the SDA and serve as a RadCon office, a change room, and other decontamination functions as required.

11. REFERENCES

Al Vaalemoen, Specialty Sales Manager, Featherlite Inc., P.O. Box 320 Hwy. 63 & 9 Cresco, IA 52136,
PH: 1-800-800-1230-1066, Cell: 641-220-3393, avaalemoen@fthr.com.

Architectural Engineering Standards.

ASCE 7, Minimum Design Loads for Buildings and Other Structures.

Dave Kolesky, Western States Equipment (Cat.), 1200 Foote Dr., Idaho Falls, ID 83415, PH 208-552-3411, Cell 208-520-8863.

Don Peterson, Commercial and Specialty Vehicle Manager, Winnebago Industries, P.O. Box 152 605 W. Crystal Lake Road, Forest City, IA 50436, PH: 641-585-6892, dpeterson@winnebagoind.com.

EDF-5122, OU 7-13/14 In Situ Grouting Project Electrical Utilities.

EDF-5150, OU 7-13/14 In Situ Grouting Project Support Systems.

EDF-5135, OU 7-13/14 In Situ Grouting Project Grout Storage and Mixing.

EDF-5155, OU 7-13/14 In Situ Grouting Project Operations, Maintenance, and Logistics.

Ernie Carter, Carter Technologies, PH. 281-495-2603, Cartertech@prodigy.net.

INEEL/EXT-03-00316, Feasibility Study Preliminary Documented Safety Analysis for In Situ Grouting in the Subsurface Disposal Area.

International Building Code.

OSHA Part 1910, Subpart—General Environmental Controls.

Safe Drinking Water Act.

TFR-269, Technical and Functional Requirements (Subsystem) for the In Situ Grouting Project.

Wells Cargo Portable comfort stations web site:
<http://www.wellscargocog.com/gallery.asp?id=57502&page=1>.

Appendix A

Proposed Mobile Space Winnebago Industries/Featherlite Inc. Road Trip Findings for the RWMC In Situ Grouting

**OU 7-13/14 In Situ Grouting Project
Support Facilities**

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Appendix A

Proposed Mobile Space Winnebago Industries/Featherlite Inc. Road Trip Findings for RWMC In Situ Grouting

May 27, 2004

Initially, two types of "mobile facilities" were identified on this road trip to be purchased in FY-2005 when the ISG Project was to be performed by the contractor. A shift crew office trailer and a maintenance trailer had been identified. After reviewing the maintenance procedures of the trackhoe drill rig and removable drill masts, it was concluded that maintenance would be minimized inside the SDA and maximized outside of the SDA. Then the directive was changed to have the ISG Project performed by a subcontractor, which changed the facility requirements and placed less emphasis on the type and quality of a mobile facility in the SDA, if any at all. It was concluded that for the purpose of this EDF, that we capture the findings of the trip report, attach it as such and recommend to the subcontractor at his option. Only one mobile shift crew office and maintenance facility for direct support of grouting operations over the next seven years of grouting the SDA at RWMC is recommended. Another mobile office type was identified to assist RadCon operations inside the SDA, however, their existing RadCon truck and trailer at RWMC was identified and reserved in support of this work and is discussed earlier in this EDF.

New mobile facilities can easily be achieved by trailer products as produced by or equal to a vendor called Featherlite Inc., out of Cresco, Iowa. By researching such vendors as Featherlite Inc., evaluating their customized products, production capabilities, quality controls, track record with customers, and an actual tour of their production plant, we concluded that Featherlite Inc. would be one if not the best vendor for such facilities. Trailer facilities by Featherlite Inc. were the best standard we found.

The estimated seven years of grouting operations of the SDA pits and trenches (approximately 120,000 holes) will need to have limited down time for grouting. Therefore, it will be extremely important to have all possible maintenance and support needs adjacent to operations with emphasis on performance.

Mobile shift crew office and maintenance trailer—it is anticipated that the grouting operations will need immediate response to trouble shooting, supervision of quality work, coordination of related work activities, and data collection. To enhance performance, the shift crew office trailer will provide office/conference space for the shift crew inside the SDA. A conference room, office with workstations for data collection, and a maintenance area will be provided within this facility trailer. The mobile facility requirements to date are as follows:

- Facility trailer (shift crew office) shall be completely portable (i.e., move twice a month), and be capable of being parked on and off the dirt roads of the SDA. A built-in, proven, safe, and completely automated load leveling system to level the facility trailer after each move in a timely manner with hand controls shall be provided.
- Facility trailer shall be by experienced (i.e., 30 years) vendor.
- Facility trailer shall have 5-year warranty on frame and shell.

- Facility trailer shall have structurally analyzed frames and enclosures to withstand rigorous and numerous moves and operations.
- Except for windows and slide outs (of aluminum construction), the facility trailer roof and side walls shall be of (painted) continuous smooth 090 gauge sheet aluminum for strength and deconability.
- Aluminum walls shall be insulated to a minimum of R-15.
- Facility trailer shall be provided with its own HVAC system.
- Facility trailer shall be 8 ft-6 in. wide, 53-ft long, 13 ft-6 in. high and of all aluminum, noncorrosive construction (other than critical structural features) to allow for more payload, minimize decontamination/maintenance concerns, and extend life cycle.
- Facility trailer shall be equipped with 17 ft slide-out options on each side for space enhancements, estimate at 600 + ft²/unit. This area of the trailer shall have two (with expansion four) PC workstations with wireless network connection.
- Kingpin to rear axle will not exceed bridge laws (i.e., no greater than 40 ft).
- Floor surfacing shall be impervious with integral curb and finish (i.e., nonslip and decontaminable). The height of the floor surface shall be no higher than 22 in. from the ground.
- Facility office trailer nose shall have windows, potential slide outs on each side, and a conference room with fold-out/expandable table with seating for 6 people.
- Facility trailer shall be durable to withstand highway transportation, regular moves and restaging over the SDA roadways with out racking, jeopardizing its resale, reuse, and facility values while minimizing depreciation loss.
- Facility trailer shall have wireless communications (e.g., telephone and fax) insulated with HVAC climate control capabilities.
- Facility trailer shall have both interior and exterior lighting, including diesel generator.
- Exterior slide-out compartments, where possible beneath the facility, shall be incorporated for storage items.
- All doors shall have insect screen and plastic air curtain capabilities,
- Trailer office shall have DVD player and TV monitor and digital video replay. Think in terms of digital replay of video versus tapes. In other words, the digital replay of any image data would be retrieved from the computer server.
- Trailer office shall have communications with the shift desk (e.g., radios). A place for the RWMC-approved handheld trunk radios with battery chargers shall be provided.
- Data collection for visual, density, depth, and volume monitoring equipment for grouting shall be provided

- Integral drawers with glides, P/L cabinets, storage closets with melamine surfaces, solid surfacing counter-tops, and specialized compartments shall be provided.
- Awnings for work enhancements and out rigging (foldouts) for auxiliary lighting shall be provided.
- Parallel work counters, cupboards, and windows on each side of the slide-out portions with SS bench top surfaces, P/L cabinet faces, and upper cupboards shall be provided.
- Workbenches shall be equipped with vice, pipe vices, beveller, chop saw, grinder, anvil, 1/2-hp drill press, and bolt and screw fastener bins.
- Rear portion behind the wheel wells shall be open work area for general repairs, service, assembly, and disassembly of equipment.
- Facility trailer shop shall have overhead rail with 500 # hoist and attic with storage racks, and slide-out compartments for parts and material stock.
- Access to such shall be by electric internal screw lift type platform for reliability. Screw lift platform shall also be the end door of the trailer.
- Shop area shall have manifold compressed air and shop vacuum.
- Facility trailer shall provide functionally well organized, durable heavy duty, toolbox and part compartments, and drawers integral with glides, all designed for maximum efficiency and convenience.